AMENDMENTS TO THE CLAIMS

Please amend claims 1, 3-28 and 33-36 as follows.

Please cancel claim 2 without prejudice.

Please add new claims 37-45.

1. (Currently amended) ~~A tunable filter for use in optical communication apparatus~~ An optical communication apparatus including a tunable filter, ~~said~~ the tunable filter being tunable to each selected center wavelength of a number of channels, and each of the channels centered on a corresponding gridline of a selected wavelength grid, ~~;said~~ the tunable filter comprising:

a grid generator having reflective surfaces, mounted for optical alignment in an optical path of a beam, ~~and~~ wherein the grid generator ~~of~~ including a first selected optical path length determinative of a first free spectral range having a first plurality of transmission peaks corresponding to gridlines of the selected wavelength grid;

a channel selector having reflected surfaces, mounted for optical alignment in the optical path of the beam, ~~and~~ wherein the channel selector ~~with~~ including a tunable second optical path length determinative of a second free spectral range having a second plurality of transmission peaks within the selected wavelength grid, wherein the second free spectral range (FSR2) is related to the first free spectral range (FSR1) by the equation:

$$FSR2 \approx (M / M \pm 1)(FSR1)$$

wherein M is the total number of channels within the selected wavelength grid;

means for maintaining the first selected optical path length of the grid generator; and

means for varying the tunable second optical path length of the channel selector to tune the optical beam to a selected channel of the wavelength grid and substantially attenuate the other channels of the wavelength grid.

2. (Cancelled)

3. (Currently amended) The ~~tunable filter~~ optical communication apparatus of Claim 1, wherein a finesse of ~~said~~ the channel selector substantially corresponds with less than the number of channels of the selected wavelength grid.

4. (Currently amended) The ~~tunable filter~~ optical communication apparatus of Claim 1, wherein ~~said~~ the grid generator ~~further~~ comprises at least one of a Fabry-Perot filter and an interference element.

5. (Currently amended) The ~~tunable filter~~ optical communication apparatus of Claim 1, wherein ~~said~~ the grid generator ~~further~~ comprises an etalon.

6. (Currently amended) The ~~tunable filter~~ optical communication apparatus of Claim 1, wherein ~~said~~ the grid generator ~~further~~ comprises an ~~Etalon;~~ etalon; and wherein ~~said~~ the means for maintaining the first optical path length of the grid generator comprises a thermal controller to control a temperature of ~~said Etalon~~ the etalon.

7. (Currently amended) The ~~tunable filter~~ optical communication apparatus of Claim 1, wherein ~~said~~ the channel selector ~~further~~ comprises at least one of: a diffraction element, an interference element, and a birefringent element.

8. (Currently amended) The ~~tunable filter~~ optical communication apparatus of Claim 1, wherein ~~said~~ the means for varying the tunable second optical path length of the channel selector comprises a mechanical actuator to tune ~~said~~ the channel selector by varying the tunable second optical path length of ~~said~~ the channel selector.

9. (Currently amended) The ~~tunable filter~~ optical communication apparatus of Claim 1, wherein ~~said~~ the means for varying the tunable second optical path length of the channel selector comprises a thermal actuator to tune ~~said~~ the channel selector by varying a temperature of the channel selector.

10. (Currently amended) The ~~tunable filter~~ optical communication apparatus of Claim 1, wherein ~~said~~ the means for varying the tunable second optical path length of the channel selector comprises an electro-optic actuator to tune ~~said~~ the channel selector by varying the tunable second optical path length of ~~said~~ the channel selector.

11. (Currently amended) The ~~tunable filter~~ optical communication apparatus of Claim 1, wherein the channel selector includes at least one of selected length and a tunable index of refraction.

12. (Currently amended) The ~~tunable filter~~ optical communication apparatus of Claim 1, wherein the channel selector includes a tunable length and a selected index of refraction.

13. (Currently amended) The ~~tunable filter~~ optical communication apparatus of Claim 1, wherein ~~said~~ the channel selector comprises:

a gas spaced etalon including a gap to hold a gas, the gas spaced etalon tunable by ~~means of tuning~~ adjusting a pressure of [[a]] the gas within the gap to vary the second optical path length.

14. (Currently amended) The ~~tunable filter~~ optical communication apparatus of Claim 1, wherein ~~said~~ the channel selector comprises:

an etalon electrically tunable in response to an applied electric field to vary the second optical path length.

15. (Currently amended) The ~~tunable filter~~ optical communication apparatus of Claim 1, wherein the channel selector further comprises:

an etalon thermally tunable in response to an applied thermal energy to vary the second optical path length.

16. (Currently amended) The ~~tunable filter~~ optical communication apparatus of Claim 1, wherein ~~said~~ the channel selector ~~further~~ comprises:

a semiconductor element with a tunable index of refraction responsive to an applied electric field to vary the second optical path length.

17. (Currently amended) The ~~tunable filter~~ optical communication apparatus of Claim 7, wherein the birefringent element includes at least one of: a Pockels cell and a Kerr cell.

18. (Currently amended) The ~~tunable filter~~ optical communication apparatus of Claim 7, wherein the interference element comprises:

a wedge-shaped etalon.

19. (Currently amended) The ~~tunable filter~~ optical communication apparatus of Claim 18, wherein the interference element comprises at least one of a wedge-shaped solid etalon and a wedge-shaped air gap etalon.

20. (Currently amended) The ~~tunable filter~~ optical communication apparatus of Claim 18, wherein ~~said~~ the means for varying the tunable second optical path length comprises an actuator for translating ~~said~~ the wedge-shaped etalon across the optical path of the beam to tune the second optical path length.

21. (Currently amended) The ~~tunable filter~~ optical communication apparatus of Claim 1, wherein ~~said~~ the channel selector ~~further~~ comprises a grating; and wherein ~~said~~ the means for varying the tunable second optical path length of the channel selector comprises an actuator for varying an angle of ~~said~~ the grating with respect to ~~an~~ the optical path of the beam to tune the beam to ~~a selected one of the plurality of channels~~ the selected channel of the wavelength grid.

22. (Currently amended) The ~~tunable filter~~ optical communication apparatus of Claim 1, further comprising:

a logic to tune ~~said~~ the channel selector to the selected ~~one of the number of channels~~ channel of the wavelength grid.

23. (Currently amended) The ~~tunable filter~~ optical communication apparatus of Claim 1, further comprising:

a logic to tune ~~said~~ the grid generator to the selected wavelength grid.

24. (Currently amended) ~~In the~~ The optical communication apparatus of Claim 1, [[a]] further ~~improvement of~~ comprising:

a gain medium to emit [[a]] the beam, and ~~said~~ the gain medium capable of accepting feedback to tune the gain medium to a selected one of the number of channels of the wavelength grid.

25. (Currently amended) The optical communication apparatus of claim 1, further comprising:

a first optical circulator including a first port, a second port, and a third port; and ~~with at least a first port, a second port and a third port and a beam entering the first port exiting the second port, and the beam entering the second port exiting the third port;~~

a second optical circulator including a first port, a second port, and a third port, ~~with at least the first port, the second port and the~~ a third port ~~and the beam entering the first port exiting the second port, and the beam entering the second port exiting the third port; and~~

~~said~~ wherein the tunable filter optically coupled ~~to~~ between the second port of ~~said~~ the first optical circulator and the first port of ~~said~~ the second optical circulator, the tunable filter to tune a selected one of the number of channels of the wavelength grid to pass between the second port of ~~said~~ the first optical circulator and the first port of ~~said~~ the second optical circulator.

26. (Currently amended) The optical communication apparatus of Claim 1, further comprising:

a gain medium tunable to emit [[a]] the beam at a selected wavelength;

said ~~the~~ the tunable filter ~~with~~ including an input ~~and~~ an output, ~~and said~~ the tunable filter input positioned in ~~an~~ the optical path of the beam ~~to provide at said output a filter of said beam at a selected one of the number of channels of wavelength grid~~;

an error detector to detect a difference in energy levels of ~~said~~ the beam at ~~said~~ the input and ~~said~~ the output of ~~said~~ the tunable filter and to generate an error signal based on the difference; and

a logic to receive the error signal and ~~for providing a closed loop feedback of the difference to tune~~ to adjust a control parameter of ~~said~~ the gain medium ~~to the selected one of the number of channels~~ in response to the error signal.

27. (Currently amended) The optical communication apparatus of Claim 1, ~~and said~~ wherein the grid generator comprising:

a gain medium to emit [[a]] the beam, ~~and~~ the gain medium including a front facet and a rear facet ~~and~~ , wherein the first selected optical path length between the front facet and the rear facet determinative of the first free spectral range and corresponding to the spacing between adjacent gridlines of the selected wavelength grid.

28. (Currently amended) The optical communication apparatus of Claim 1, ~~and said~~ wherein the channel selector comprising:

a gain medium to emit [[a]] the beam, ~~and~~ the gain medium including a front facet and a rear facet ~~and~~ , wherein the tunable second selected optical path length between the front facet and the rear facet determinative of the second free spectral range~~, a difference between the first free spectral range and the second free spectral range being inversely proportional to the number of channels of the selected wavelength grid, and said second optical path length tunable to a selected one of the number of channels of the wavelength grid~~.

Claims 29-32 (Cancelled)

33. (Currently amended) ~~A method for filtering an optical beam to a corresponding center wavelength for each of a number of channels of a selected wavelength grid,~~ A method to filter an optical beam, comprising:

generating a first set of wavelengths corresponding to a first plurality of transmission peaks within the optical beam, the first set of wavelengths having a first free spectral range corresponding to the center wavelengths of each of the channels of the selected wavelength grid;

generating a variable second set of wavelengths corresponding to a second plurality of transmission peaks within the optical beam, the variable second set of wavelengths having a second free spectral range, wherein the second free spectral range (FSR2) is related to the first free spectral range (FSR1) by the equation:

$$FSR2 \approx (M / M \pm 1)(FSR1)$$

wherein M is the total number of channels within the selected wavelength grid; ~~and~~

generating a tuning signal at a channel tuner; and

varying the variable second set of wavelengths based on the tuning signal to select a desired channel of the channels of the selected wavelength grid. ~~such that the optical beam is substantially attenuated at all center wavelengths of each of the channels of the selected wavelength grid except a desired channel.~~

34. (Currently amended) The method of Claim 33, wherein ~~the step of~~ generating the first set of wavelengths comprises aligning a grid generator having an optical path length determinative of the first free spectral range with the optical beam.

35. (Currently amended The method of Claim 33, wherein ~~the step of~~ generating the variable second set of wavelengths comprises ~~the step of~~ aligning a channel selector having a variable optical path length determinative of the second free spectral range with the optical beam.

36. (Currently amended) The method of Claim ~~33~~ 35, wherein ~~the step of~~ varying the variable second set of wavelengths comprises ~~the step of~~ varying the optical path length of the channel selector.

37. (New) An apparatus, comprising:

a grid generator in an optical path of an optical beam, wherein the grid generator including a first selected optical path length determinative of a first free spectral range having a first plurality of transmission peaks corresponding to gridlines of a selected wavelength grid;

a channel selector in the optical path of the optical beam, wherein the channel selector including a tunable second optical path length determinative of a second free spectral range having a second plurality of transmission peaks within the selected wavelength grid, wherein the second free spectral range (FSR2) is related to the first free spectral range (FSR1) by the equation:

$$FSR2 \approx (M / M \pm 1)(FSR1)$$

wherein M is the total number of channels within the selected wavelength grid;

a grid controller operatively coupled to the grid generator to tune the grid generator to the selected wavelength grid by adjusting the first selected optical path length of the grid generator; and

a channel tuner operatively coupled to the channel selector to tune the channel selector to a selected channel of the channels of the wavelength grid by adjusting the tunable second optical path length of the channel selector.

38. (New) The apparatus of claim 37, further comprising:

a gain medium including a front facet and a rear facet, the optical beam to be emitted from the front facet;

a reflector positioned in the optical path of the optical beam, the grid generator and the channel selector positioned between the gain medium and the reflector, a laser cavity defined by the rear facet and the reflector; and

an output assembly including coupling optics, the output assembly optically coupled to the rear facet of the gain medium.

39. (New) The apparatus of claim 37, further comprising a thermal actuator thermally coupled to the grid generator to adjust the first selected optical path length of the grid generator, the thermal actuator operatively coupled to the grid controller.

40. (New) The apparatus of claim 37, further comprising a thermal actuator thermally coupled to the channel selector to adjust the tunable second optical path length of the channel selector, the thermal actuator operatively coupled to the channel tuner.

41. (New) The apparatus of claim 37, further comprising an electro-optic actuator coupled to the channel selector to adjust the tunable second optical path length of the channel selector, the electro-optic actuator operatively coupled to the channel tuner.

42. (New) The apparatus of claim 37, further comprising an actuator coupled to the channel selector to move the channel selector to adjust the tunable second optical path length of the channel selector, the actuator operatively coupled to the channel tuner.

43. (New) The apparatus of claim 37, further comprising:
a first optical circulator including a first port, a second port, and a third port; and
a second optical circulator including a first port, a second port, and a third port,
wherein the grid generator and the channel selector optically coupled between the second port of the first optical circulator and the first port of the second optical circulator, the third port of the first optical circulator optically coupled to the third port of the second optical circulator,
wherein the optical beam to enter the first port of the first optical circulator and to exit the second port of the second optical circulator.

44. (New) The apparatus of claim 37, further comprising:
an error detector including a first photodetector positioned in the optical beam before the grid generator and a second photodetector positioned in the optical beam after the channel selector, wherein the error detector to generate an error signal based on a difference in

energy levels of the optical beam detected at the first photodetector and the second photodetector.

45. (New) The optical communication apparatus of claim 25 wherein the third port of the first optical circulator optically coupled to the third port of the second optical circulator, wherein non-selected channels of the wavelength grid to exit the third port of the first optical circulator and to enter the third port of the second optical circulator.